

Due Date: October 2, 2006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:)	
)	
Inventor: Clinton A. Staley et al.)	Examiner: Wong, Allen C.
)	
Serial #: 09/672,352)	Group Art Unit: 2621
)	
Filed: September 28, 2000)	Appeal No.: _____
)	
<u>Title: VARIABLE BIT-RATE ENCODING</u>)	

REPLY BRIEF OF APPELLANTS

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In accordance with 37 C.F.R. §41.41, Appellants hereby submit their Reply Brief on Appeal from the final rejection of claims 1, 4-6, 8-19, 21, and 23-31 of the above-identified application, as set forth in the Office Action mailed December 9, 2005.

No fee is required for filing this Reply Brief. However, the Office is authorized to charge any necessary fees or credit any overpayments to Deposit Account 50-0494 of Gates & Cooper LLP.

I. ARGUMENTS

Independent Claims

In the Appellants' Appeal Brief, Appellants noted on page 5, the following specific problems with the teachings of the prior art:

(1) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest a separate function, for each frame in a sequence of frames, that relates encoded size to encoded quality for each frame;

- (2) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest a search of all of the separate functions to determine a best quality value to encode the entire sequence;
- (3) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest encoding each frame using the same determined best quality for all of the frames; and
- (4) Lim teaches away from searching all of the separate functions prior to encoding any of the frames.

Thereafter, Appellants set forth the various arguments in support of the above assertions. The Examiner's answer addresses the brief on a page by page basis. Rather than address the Examiner's Answer on a page by page basis, Appellants address the primary arguments set forth herein:

- (1) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest a separate function, for each frame in a sequence of frames, that relates encoded size to encoded quality for each frame;

In the initial portion of the Answer, the Examiner merely repeats verbatim the arguments set forth in the Advisory Action mailed March 3, 2006. Appellants refer the Board to the Appeal Brief for the substance of these arguments.

In addition, on page 11 of the Answer, the Examiner respectfully disagreed with the assertions in the Appeal Brief and summarily states:

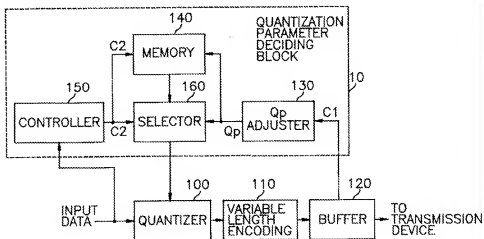
"One of ordinary skill in the art knows that a frame is subdivided into slices, and eventually, the data is evaluated and determined on the basis of frames."

Appellants submit that such a statement has no foundation in any of the cited references. In addition, Appellants note that not only are separate functions for each frame determined, but all of these separate functions are searched prior to performing any encoding. Thus, each of the functions has to be created and exist prior to any encoding existing. Thus, regardless of whether a frame is subdivided into slices and evaluated, the Examiner is ignoring that it is the functions and not the frames that are searched and evaluated. Again, a number of separate functions are determined for each frame and the separate functions are searched and evaluated. The individual frames are not searched and evaluated in the claims. Such capability and functionality is completely lacking from Lim or the other cited references.

The Examiner's Answer continues and states:

Regarding lines 18-19 on page 7 of appellant's arguments, appellant argues that element 10 is the quantization parameter deciding block and not the controller, and that element 150 is the controller. Lim's element 10 functions as a quantization controller that determines a quantization parameter or a best quality value Q_p . In fig.1, Lim discloses the controller 10 is connected to the buffer 120 that receives various amounts or sizes of image frames encoded by coder 110, in that a sequence of frames is sent through the encoding system of fig.1 in a recyclical or recursive manner that applies an MPEG video image encoding recursive rate control encoding scheme for encoding a plurality of images, I, P and B frames. Each frame within that sequence of frames (GOP) have different sizes. Further, Lim's fig.1, there is a quantization controller 10 and a selector 160 that decides which quantization parameter to use on the evaluated frame(s) in order to properly allocate the number of bits to the evaluated frame(s) for efficient coding. Thus, Lim teaches a separate function, for each frame in a sequence of frames, that relates encoded size to encoded quality for each frame.

Appellants again traverse such assertions. The terminology used in Lim is very specific and Lim is entitled to be his own lexicographer. Lim explicitly provides that the controller is box 150 and it is not connected to the buffer. Further, Lim explicitly states that box 110 is the variable length encoder. As illustrated:



The Examiner is now suggesting an interpretation directly contrary to the Figure and text of Lim. As explicitly set forth in Lim col. 3, lines 37-40:

The quantized data is then coupled to a conventional variable length encoding block 110 which serves to generate encoded video data by employing, e.g., a run-length coding and a Huffman coding techniques.

In this regard, block 110 is not a controller whatsoever. Instead, it encodes data and does not serve as a controller as asserted by the Examiner.

The Answer continues on page 13 and in response to Appellants' assertions with respect to Lim's teaching relating to individual slices of a frame, again summarily concludes that:

“One of ordinary skill in the art knows that a frame is subdivided into slices, and eventually, the data is evaluated and determined on the basis of frames.”

Again, there is no foundation or support for such an assertion in the cited art. Further, Official Notice of such an allegation has not been taken by the Patent Office. Accordingly, the rejection is improper and in error. Additionally, Appellants reassert that arguments above.

The Answer continues on page 13 traversing the Appeal Brief's contentions relating to the deficiencies of Linzer. One of the primary arguments was that the claims provide for searching the separate functions and not a search of the frames. In response, the Answer provides:

The examiner respectfully disagrees. Linzer is used to teach *prior to encoding* any of the frames that performs a search of all frames in the sequence of frames for a best quality value, as disclosed in Linzer's fig.3, element 24. Also, see col.5, ln.63-67, col.6, ln.9-13 and ln.25-26, where the statistics gatherer 24 obtains a search of all the frames from the video sources to obtain a best quality value prior to encoding any of the frames. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner, as suggested in Linzer's column 3, line 64 to column 4, line 13.

As can be seen in the above language, the Examiner merely ignores the claim limitation and argument relating to searching the functions rather than the claims. Again, neither Lim nor Linzer teach such a claim element. Further, Linzer completely fails to teach a determination of a function whatsoever. Without teaching a function, Linzer cannot possibly teach a search of such functions to determine a best quality value.

In the Appeal Brief, Appellants asserted “Linzer lacks any capability, suggestion, or motivation to create a function or to search various functions to determine the best quality value for encoding all of the frames in a sequence.”

In response, the Answer concludes that such a statement asserts that there was no motivation to combine Lim with Linzer. The Answer continues and specifies a motivation. Appellants disagree and again assert that Linzer fails to teach, disclose, suggest, hint at, or allude to the creation or determination of function or a search of various functions for a best quality value for encoding all of the frames in a sequence. Such a lack of existence or suggestion in Linzer of a function or search of functions clearly fails to establish a prima facie case of obviousness.

In addition, as set forth subsequently in the Appeal Brief (and below herein), Linzer cannot be combined with Lim for various reasons. With respect to the motivation to combine, the Answer asserts:

...In this case, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner, as suggested in Linzer's column 3, line 64 to column 4, line 13.

Appellants respectfully traverse such an assertion. Again, gathering pre-encoding data is not what the claims provide for. In addition, such pre-encoding data is not used at all in Lim. Instead, as one slice is being encoded, another is being evaluated. Accordingly, such gathering cannot and will not work in Lim. Thus, contrary to that asserted by the Examiner, there is no motivation to combine the references.

(2) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest a search of all of the separate functions to determine a best quality value to encode the entire sequence;

In the initial portion of the Answer, the Examiner merely repeats verbatim the arguments set forth in the Advisory Action mailed March 3, 2006.

On pages 15 and 16, the Answer continues and asserts that Lim teaches a search of all of the functions. In the Answer's text, the only reference to a function is:

The Qp adjuster 130 of Lim's fig.1 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp out of a plurality of quality values obtained by functions performed by Qp adjuster and evaluation of the multitudes of degrees of buffer fullness.

Appellants reassert the arguments set forth in the Appeal brief. In addition, it is noted that there are no functions indicated as being performed by Qp adjuster whatsoever. Further, Lim fails to describe a search of numerous separate functions, with each separate function determined on a per frame basis, to find a best quality value. Again, not only does Lim fail to describe a function as claimed, but Lim also fails to even remotely allude to a search of numerous separate functions as claimed.

In addition to the above, Appellants note that the function as claimed relates encoded size to encoded quality for each frame in a sequence. Such a ratio or relationship between encoded size and quality for each frame in a sequence is neither taught or suggested anywhere in Lim. The Answer asserts that the quality of the encoded bit frames are monitored by checking on the buffer fullness to determine the total size constraint. However, such an assertion is misleading. In this regard, an electronic search of Lim for the term "constraint" returns no results. Similarly, an electronic search

of Lim for the term “size” returns no results. Without even mentioning these terms, Lim cannot possibly disclose a function that related encoded size to encoded quality for each frame. Further, the Answer is setting forth an assertion that mischaracterizes Lim.

(3) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest encoding each frame using the same determined best quality for all of the frames; and

In the initial rejection of this argument, the Examiner provides:

In figure 1, Lim discloses that Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, and coder 110 utilizes the information from quantization parameter deciding block 10 for coding with the best quality value. Thus, Lim teaches encoding each frame using the same determined best quality for all of the frames.

Appellants respectfully disagree. Firstly, there are two aspects to this particular argument: (1) an entire frame is being encoded based on a single quality, and (2) ALL of the individual frames are encoded with the SAME best quality. Such explicitly set forth claim limitations are wholly and completely lacking from Lim. As stated in the Appeal Brief, Lim is merely determining a Qp value to use to encode a particular slice of a frame. In this regard, a function for an entire frame among a sequence of frames is not determined. A complete function for a frame is never determined in any manner whatsoever. Thus, Lim is not determining a function whatsoever for an entire frame. Instead, a Qp is determined on a slice by slice basis without any consideration of the entire frame (as claimed).

In addition, as set forth further below, Lim cannot teach the use of a single determined best quality to use to encode every one of the frames in a sequence. Instead, each slice of a single frame is based on the preceeding slice. Numerous frames in a sequence are not even remotely considered or evaluated in Lim or the other cited references.

The Answer continues on page 16 and disagrees with Appellants assertions relating to Lim’s teaching away. In this regard, the Answer again merely sets forth the following assertion:

“One of ordinary skill in the art knows that a frame is subdivided into slices, and eventually, the data is evaluated and determined on the basis of frames.”

Appellants reassert the arguments in the Appeal Brief and those set forth above.

(4) Lim teaches away from searching all of the separate functions prior to encoding any of the frames.

In responding to this assertion, the Answer states that Linzer and Gonzales are combinable and useable together because the references pertain to the same analogous MPEG video encoding environment. The Answer then summarily concludes: "Thus, Lim does not teach away from searching all of the separate functions prior to encoding any of the frames."

Appellants respectfully traverse and disagree with such assertions. As set forth in the Appeal Brief, Lim teaches evaluating individual slices of a frame rather than searching all of the functions wherein a separate function is created for each frame in a sequence of frames. In addition, Lim explicitly teaches encoding one slice at a time. Further, since Lim requires the value of the current slice that is being encoded in order to determine the Qp to utilize (see col. 3, line 47-col. 4, line 8), it is impossible to perform a search of the various functions prior to encoding any of the frames. Instead, Lim encodes each slice in real time dynamically while examining the buffer and the slice that is being encoded. By dynamically encoding such information, it is impossible to perform a search of all of the functions prior to encoding any frames. In this regard, Lim actually teaches away from the claimed methodology that teaches the performance of a search prior to encoding any of the frames.

Further, since Lim teaches away from such an implementation, even if combined with Gonzales, the presently claimed invention would (a) not result; and (b) not work.

Dependent Claim 4

On page 11 of the Appeal Brief, Appellants set forth separate arguments with respect to dependent claim 4. Namely, claim 4 explicitly provides that a search range for the best quality value is reduced by subdivision. Such a limitation is not present anywhere in the independent claims.

All of the rejections of this claim via Office actions and in the Answer summarily reject this claim stating that claims 4-6 and 21 are similar to claims 1 and 19 and are rejected in a similar manner. Appellants again note that none of the Actions ever remotely address the explicit claim limitations of claim 4. Further, such limitations are not similar to those set forth in the independent claims and are independently patentable. Accordingly, the Examiner has failed to establish a prima facie case of obviousness and request reversal of the rejection.

Dependent Claim 5

On page 12 of the Appeal Brief, Appellants set forth separate arguments with respect to dependent claim 5. Namely, claim 5 explicitly recites a search using a subdivision search algorithm. Such a limitation is not present anywhere in the independent claims.

All of the rejections of this claim via Office actions and in the Answer summarily reject this claim stating that claims 4-6 and 21 are similar to claims 1 and 19 and are rejected in a similar manner. Appellants again note that none of the Actions ever remotely address the explicit claim limitations of claim 5. Further, such limitations are not similar to those set forth in the independent claims and are independently patentable. Accordingly, the Examiner has failed to establish a prima facie case of obviousness and request reversal of the rejection.

Dependent Claims 6 and 21

On pages 12-13 of the Appeal Brief, Appellants set forth separate arguments with respect to dependent claim 6 and 21. Namely, dependent claims 6 and 21 explicitly recite that the search in dependent claim 5 is a binary search algorithm. Such a limitation is not present anywhere in the independent claims.

All of the rejections of this claim via Office actions and in the Answer summarily reject this claim stating that claims 4-6 and 21 are similar to claims 1 and 19 and are rejected in a similar manner. Appellants again note that none of the Actions ever remotely address the explicit claim limitations of claims 6 and 21. Further, such limitations are not similar to those set forth in the independent claims and are independently patentable. Accordingly, the Examiner has failed to establish a prima facie case of obvious

Dependent claims 8 and 23

On page 13 of the Appeal Brief, Appellants set forth arguments relating to these dependent claims. In addressing these arguments, the Answer merely repeated the prior rejections. Accordingly, Appellants reassert the arguments set forth in the Appeal Brief. Further, Appellants note that the Examiner has failed to contradict or disagree with the assertions relating to MPEG encoding and I, P, or B frames set forth in the Appeal Brief. In addition, Appellants note that the

Examiner has failed to identify or indicate any portion of the cited references that support the assertions in the Answer.

Dependent Claims 9, 17, and 24

On pages 13-14 of the Appeal Brief, Appellants set forth various detailed arguments with respect to the rejection of these claims. In response, the Answer states that the Examiner disagrees and essentially repeats word for word (with some slight modifications) the identical assertions set forth in the final Office Action. Appellants again traverse and reassert the arguments set forth in the Appeal Brief.

Dependent Claims 10, 18, and 25

On page 15 of the Appeal Brief, Appellants set forth various detailed arguments with respect to claims 10, 18, and 25.

In response, the Answer merely states that the claim language is similar to claims 9, 17, and 24. Appellants reassert the arguments in the Appeal Brief and again note that are clear differences between the claims including non-obvious limitations. Accordingly, Appellants traverse the assertions in the Answer and respectfully request reversal of the rejections.

Dependent Claims 11, 29, and 31

On page 15 of the Appeal Brief, Appellants set forth various detailed arguments with respect to claims 11, 29, and 31. As stated in the Appeal Brief, there are distinguishable differences set forth in these dependent claims. Specifically, these claims provide for use of multiple processors in parallel. Neither the Office Action nor Answer even acknowledge these differences. Instead, the Answer merely states that the limitations are similar to claims 1 and 19. Appellants traverse and set forth that the Office Action and Answer fail to establish a prima facie case of obviousness and are in clear error.

Dependent Claims 12, 13, 14, and 26

On pages 15-16 of the Appeal Brief, Appellants set forth various detailed arguments with respect to claims 12, 13, 14, and 26. Namely, the specific and explicitly claimed limitations are

described. Appellants noted the lack of any specific rejection of such limitations in the Office Actions. In response, the Answer merely repeats the rejection stating that the limitations are similar to claims 1 and 19.

Again, these claims provide for selecting an encoded image quality of one of the plurality of frames and deciding whether the encoded size associated with the encoded image quality satisfies a constraint based on transmission bandwidth, receiver buffering, total compressed size, or receiver prebuffering. Dependent claim 13 depends on claim 12 and provides that the deciding is based on two of the following: transmission bandwidth, receiver buffering, and receiver prebuffering. Dependent claim 14 depends on claim 12 and further provides for determining the encoded size from the form of the functional relation between the encoded quality and the encoded size for the associate frame.

None of these limitations exist in the independent claims. Further, the limitations are non-obvious in view of the independent claims. In view of the above, Appellants submit that the Examiner has failed to establish a prima facie case of obviousness and the rejection is in clear error. As a result, Appellants respectfully request reversal of the rejections.

Dependent Claim 15

On page 16 of the Appeal Brief, Appellants set forth various detailed arguments with respect to dependent claim 15. Similar to the rejection of the above claims, the Examiner merely states the limitations are similar to claims 9-11 and 14-25.

Appellants note that dependent claim 15 provides for selecting a plurality of qualities that has a closest value to the best quality value and transmitting frames encoded with such a quality value.

Such limitations are not present in claims 19-11 or 14-25. Accordingly, the Examiner has failed to establish a prima facie case of obviousness and the rejection is in clear error. As a result, Appellants respectfully request reversal of the rejections.

Dependent Claims 27, 28, and 30

On page 17 of the Appeal Brief, Appellants set forth various detailed arguments with respect to dependent claims 27, 28, and 30. Namely, dependent claims 27, 28, and 30 provide for the

situation when the encoded frames do not satisfy the constraints. In such a situation, a new separate function is determined based on the prior separate function and the process is repeated with the new function.

The Answer repeats the prior rejections by stating that the limitations are similar to claims 1 and 19. Again, such limitations are not present in claims 1 or 19. Accordingly, the Examiner has failed to establish a prima facie case of obviousness and the rejection is in clear error. As a result, Appellants respectfully request reversal of the rejections.

II. CONCLUSION

In light of the above arguments, Appellants respectfully submit that the cited references do not anticipate nor render obvious the claimed invention. More specifically, Appellants' claims recite novel physical features which patentably distinguish over any and all references under 35 U.S.C. §§ 102 and 103. As a result, a decision by the Board of Patent Appeals and Interferences reversing the Examiner and directing allowance of the pending claims in the subject application is respectfully solicited.

Respectfully submitted,

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